35753

FINAL EVALUATION REPORT

EVALUATION OF THE HYDROGEOLOGIC INVESTIGATION OF THE BALLY ENGINEERED STRUCTURES, INC. FACILITY PHASE II REPORT

FEBRUARY, 1987

W.A. NO. 79-36J5.0

NOTICE

The information in this document has been funded by the United States Environmental Protection Agency (U.S. EPA) under REM III Contract No. 68-01-7250 to Ebasco Services Incorporated (Ebasco).

EBASCO SERVICES INCORPORATED

EBASCO

One Oxford Valley, Suite 414, 2300 Lincoln Highway - East, Langhorne, PA 19047-1829, (215) 752-0212

February 17, 1987
NUSP/87-0070
RM/3/87-0024

Ms. Kathryn Hodgkiss
CERCLA Enforcment Section
U.S. Environmental Protection Agency
Region III
841 Chestnut Street
Philadelphia, Pennsylvania 19107

Subject: REM III PROGRAM - EPA CONTRACT NO. 68-01-7250
WORK ASSIGNMENT NO. 79-36J5.0
BALLY SITE
EVALUATION OF THE HYDROGEOLOGIC INVESTIGATION OF THE BALLY ENGINEERED STRUCTURES, INC. FACILITY
PHASE II REPORT

Dear Ms. Hodgkiss:

The REM III Team is pleased to present this final report, which documents the review and evaluation of the responsible party's (Bally Engineered Structures) technical report titled, "The Hydrogeologic Investigation of the Bally Engineered Structures, Inc. Facility Phase II Report", October 27, 1986, prepared by Environmental Resources Management, Inc.

No substantive changes to the draft report were required, as EPA had no comments on the report.

Please feel free to call me at (215) 752-0214, or our Site Manager, Mr. Jeffrey P. Orient at (412) 788-1080 to discuss our evaluation report.

Very truly yours,

Richard C. Evans, P.E.
Regional Manager, Region III

RCE/dlf

Enclosure:
cc: Mr. E. Shoener - EPA, Region III
Ms. P. Tan - EPA, Region III
Dr. M. Yates - ZPMO
Dr. W. Mendez - ZPMO
Mr. J. Orient - NUS

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Ms. Kathryn Hodgkiss
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OF THE BALLY ENGINEERED STRUCTURES, INC. FACILITY
PHASE II REPORT
BALLY SITE
BALLY, BERKS COUNTY, PENNSYLLVANIA

ACKNOWLEDGMENT OF RECEIPT

Please acknowledge receipt of this enclosure by signing this acknowledgment and returning it to: Mr. Richard C. Evans, P.E., One Oxford Valley, Suite 414, 2300 Lincoln Highway, East, Langhorne, Pennsylvania 19047.

Signature _____ Date _____

February 17, 1987

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EVALUATION OF THE HYDROGEOLOGIC INVESTIGATION OF THE BALLY ENGINEERED STRUCTURES, INC. FACILITY PHASE II REPORT

BALLY SITE
BALLY, BERKS COUNTY, PENNSYLVANIA

EPA WORK ASSIGNMENT NO. 79-36J5.0
under
Contract No. 68-01-7250

Prepared by:
NUS Corporation
Pittsburgh, PA

Approved By:
Ebasco Services Incorporated
Langhorne, PA

Prepared By:

Jeffrey P. Orient
Site Manager
NUS Corporation

Approved By:

Richard C. Evans, P.E.
Regional Manager, Region III
Ebasco Services Incorporated

EVALUATION OF HYDROGEOLOGIC INVESTIGATION OF THE BALLY EGINEERED STRUCTURES, INC. FACILITY PHASE II REPORT, ENVIRONMENTAL RESOURCES MANAGEMENT, INC., OCTOBER 27, 1986

1.0 INTRODUCTION

This review and evaluation of the Hydrogeologic Investigation of the Bally Engineered Structures, Inc. Facility Phase II Report was conducted at the request of EPA Region III. The evaluation report is to be used as a basis for the Responsible Party to generate a Work Plan detailing the work to be done in order to complete a Remedial Investigation.

In order to become familiar with the site's history, the background documents listed in the Final Work Plan for oversight activities and the Phase I letter report generated by Environmental Resources Management, Inc., were reviewed but not commented on.

In general, the technically reviewed report provides a good beginning for a remedial investigation, however, there are a number of deficiences that must be addressed before the site can be considered adequately characterized. These deficiencies are pointed out in the comments and recommendation sections of the evaluation report. The conclusions of the Phase II Report identifying the general source area of contamiantion and drawing attention to the likelihood of further environmental contamination as time passes are sound and underscore the need for further work at the site.

2.0 TECHNICAL REVIEW OF RESPONSIBLE PARTY REPORT

2.1 The following is a list of the technical review comments of the REM III Team for the Hydrogeologic Investigation of the Bally Engineered Structures, Inc. Facility, Bally, Berks County, Pennsylvania, Phase II Report, October 27, 1986, prepared by Enviromental Resources Management, Inc.

Executive Summary, pp.1 & 2 - The statement is made that the principal groundwater flow direction is to the northeast. The conditions (static or dynamic, beyond or within the cone of depression of pumping wells) under which the water levels which were used to determine flow directions were taken should be stated (which municipal/water supply wells were being pumped at the time, or had recently been pumped). The direction of groundwater

flow at any point in time may depend a great deal on pumping conditions at the time of measurement, and the observed direction of groundwater may not represent a steady state condition.

Executive Summary, p.2 - It is stated that contaminants reach Municipal Well No. 3 primarily through bedding plane partings. There is no basis to isolate bedding planes as the primary pathway. Fractures in bedrock unassociated with bedding planes, and groundwater flow along the bedrock-overburden interface may be the major pathways for contaminant migration from the site to the well. Bedding plane partings are usually tight due to compression caused by the weight of the overlying rock units and are generally not as significant as high angle fractures in providing pathways for groundwater flow. Well No. 3 and the plant are aligned along a major fracture trace orientation direction as stated in the text and illustrated in Figure 3-1.

p. 1-3 - EPA gathered imagery should be incorporated into the data file regarding past disposal practices at the site.

p. 2-3 - Monitoring wells were constructed of 30 feet of PVC screen and enough solid casing to extend the "screen" to ground surface? This would be an unusual construction design, as the solid casing would be below the screen. We assume that the "well" was extended to ground surface by installing solid casing above the screen. The statement should be clarified or corrected.

p. 3-2 - The reported prominent joint orientations in the referenced letter (N65 W, 85 degrees N and N25 W, 75 degrees NE) do not correlate well with the fracture traces shown in Figure 3-1. The major fracture orientations shown in the figure are slightly west of due north and to the east-northeast.

pp. 3-2, 3-3 - There is some correlation between the strike of the bedding of the Brunswick Formation and the mapped fracture traces.

p. 3-7 - It is not known if the direction of the shallow groundwater flow system was determined under static or dynamic conditions. If it was defined under dynamic conditions then the direction of groundwater flow in Figures 3-3e and 3-36 may not represent steady state conditions.

p. 3-11 - The analysis of the water levels presented in Table 3-1 is inaccurate based on the data provided. The text states that a perched water table exists at the top of bedrock, resulting from the lowering of potentiometric levels in the bedrock groundwater flow system (due to pumping) at a faster rate than occurs in the overlying overburden flow system. This is stated to occur as a result of the existence of a low permeability layer near the top of bedrock. The nearly equal water levels observed in wells 86-3S and 86-3D are said to represent equilibrium conditions (not affected significantly by pumping) while the readings in 86-5S and 86-5D illustrate accelerated drawdown in the bedrock flow system (86-5D). In reality, water levels in the two wells vary very little in the 5/14/86 set of readings (.30' difference) while the 8/15/86 readings indicate that the potentiometric surface of the bedrock flow system is actually 3.57' higher than the water level in the overburden, which is the opposite of what would be expected if the explantion presented in the text was accurate (perched conditions). The lower than expected water level in the Plant site well may be a result of the well having a better hydraulic connection to Municipal Well No. 1 then surrounding wells. There is no shallow groundwater level data point at this location with which to determine whether perched condtions exist there. It should also be noted that a vertical hydraulic gradient (as occurs in recharge/discharge areas) may result in significant differences in shallow and deep water levels without the existance of perched conditions. As the data in the text does not support the conditions presented, the data should be reanalyzed (or corrected if wrong). Any other data available which may support or refute the statements made should also be presented.

p. 3-12 - Figure 3-36 should either be redrawn as a flow net reflecting actual site data or should be eliminated, as the schematic shown does not fit the site data (water levels in wells 86-5S and 86-5D provided in Table 3-1 are misrepresented in the figure, there is no data provided concerning shallow groundwater levels in the vicinity of Bally Municipal Well #1).

p. 3-13 - The geologic cross-sections should include municipal well and plant well locations, projected to the cross section. Well screen intervals or open hole intervals should be shown in the cross-sections.

p. 3-14 - The stated depth of the deeper bedrock aquifer (>100 feet) is inconsistent with the text immediately following it, which states that the flow system begins at depths less than 100 ft. As there is apparently no clear cut consistent boundary between the two flow systems described in the text, arbitrarily stating that the deeper flow system exists at depths greater than 100 feet may be misleading and should be avoided.

p. 3-15 - The initial suspicion that the "dump" site which appeared on historic area photographs could have been a site contributing to the existing pollution problem was founded and warranting the ERM conducted investigation. The presence of only 20 ug/kg of toluene and 30 ug/kg of methylene chloride in only one of the five soil samples taken from the area lead ERM to the conclusion that this particular site is not contributing to the problem at hand, but this site pollution problem is of a different kind. We agree that this site is NOT contributing to the area hallogenated solvent pollution. However, we feel that the low levels of methylene chloride and toluene in this one sample are laboratory artifacts. In the absence of knowledge of the laboratory reagent blank composition, a definite conclusion of this matter is impossible.

p. 3-20 - The higher contaminant concentrations found in shallow wells versus deep wells in the northeast plant area may or may not be the result of a confining layer inhibiting downward migration of groundwater. Soluble contaminant concentrations would be expected to decrease with distance from the source area due to dispersion and dilution, both horizontally and vertically. As a result, contaminant concentrations in the source area at shallow depths beneath the water table would be expected to be higher than at deeper depths whether a confining layer is present or not (unless the solubility limit of the contaminants was exceeded, which is not the case here).

p. 3-20 - Compounds with higher specific gravities than water tend to sink only if they are present in concentrations exceeding their solubility limit. If they are completely solubilized, the dissolved compounds will move in the direction of groundwater flow, and not migrate downward (except through dispersion) unless there is a vertical component to the groundwater flow direction. A vertical component to the flow gradient was induced by the pumping of Municipal Well No. 3, and this is most likely the reason for the higher contaminant concentrations observed in the deep well at location 5.

p. 3-21 - It is stated that pumping Municipal Well No. 3 altered the principal groundwater flow direction away from the preferred northeast orientation to the northwest. The point should be made that the "preferred northeast orientation" may also be an alteration of the natural groundwater flow direction, created by pumping Municipal Well No. 1 and other wells northeast of the plant.

p. 3-27 - The data in the chart representing total VOC's appears to be the same as in Figure 6 of the Phase I report showing concentrations of 1,1,1-Trichloroethane only. Are the figures labelled incorrectly?

p. 4-1, Conclusion 1 - As mentioned previously, the conditions (static or dynamic) under which the water levels used to determine the groundwater flow direction were taken should be stated. The possibility that groundwater may flow in other directions, during periods of non-pumping, should be considered. This may become as important factor in identifying potential receptors, if in the feasibility study the permanent shutting down of the municipal wells is considered as part of a remedial action.

pp. 4-1, 4-2, Conclusion 4 - Differences in water levels between shallow and deep wells at a given location do not necessarily indicate a hydraulic separation, or confining layer, between the wells. This does not mean there is not one at the site, as weathered bedrock often creates a relatively low permeability zone at the bedrock surface, but the data presented to support the idea is inconclusive at best. The remainder of this conclusion also does not make sense. The way the conclusion is stated, the presence of nearly identical water levels in shallow and deep wells at the site indicates perched water table conditions are being observed. The conclusion should be clarified and supported with additional data.

p. 4-2, Conclusion 6 - See Comment 1 for page 3-20.

p. 4-3, Conclusion 9 - See Comment 2 for page 3-20.

Appendix B - Appendix B provides a listing of the laboratory analyses, both soil and water, but no information regarding the QA/QC procedures employed by the analyzing laboratory is provided, except for a listing of detection limits. The data could gain credibility if QA/QC protocols were available for review, and so could the conclusion drawn based on these data.

Recommendations for Further Work

The recommendations for the additional work needed to provide a complete site characterization to use in performing a feasibility study are as follows:

1) The source area of the contamination at the plant should be located more accurately and an attempt made to characterize the source area in regards to the types and volumes of wastes present and the size of the source area. Do any records of excavation exist pertaining to the lagoon area from the construction of the warehouse?

2) A monitoring well cluster should be installed southeast of the plant, near PA Route 100/Barto Avenue intersection, to monitor groundwater quality south-southeast of the suspected source areas. A deep monitoring well should be installed adjacent to shallow monitoring well 86-4, and a shallow well installed adjacent to the plant well, in order to more fully characterize the vertical distribution of contamination at the plant.

3) Several series of water levels should be taken and analyzed. One series should be taken while Municipal Well No. 3 is pumping, one series when Municipal Well No. 1 is pumping, and two series taken at times when none of the municipal/ industrial wells are pumping, and have not been pumped for at least 8-12 hours (to determine groundwater flow directions during non-pumping conditions). As many of the municipal, industrial, and residential wells as possible should be included when measuring water levels. At a minimum, the Bally Ribbon Mill well and the Great American Knitting Mill should be included. Should groundwater flow directions turn out to be in another direction other than northwest or northeast, during nonpumping or steady state conditions, at least one monitoring well cluster should be installed downgradient of the site in the identified direction. More clusters may be required based on the findings from the first cluster.

4) More information should be gathered on solvent use at the plant.

5) A comprehensive risk assessment should be performed.

6) The inferred existence of a perched water table should be verified. A shallow monitoring well adjacent to either Municipal Well No. 1 or Municipal Well No. 3, and a pumping test at one of the installed monitoring well clusters will provide evidence to either confirm or refute the existence of this condition in the site area.

7) Groundwater flow directions and contaminant concentrations in the shallow and deep groundwater flow systems should be studied separately. Potentiometric surface maps and isoconcentration maps of each flow system should be prepared and analyzed separately. Additional data points may be required to perform an adequate analysis of each flow system.

8) Aquifer characteristics, including hydraulic conductivity/transmissivity values, should be defined for each of the flow systems identified at the site.

9) Groundwater sampling and analysis, including all wells used in the study, should be performed after the installation of the additional monitoring wells.